WHAT IS CLAIMED IS:

1. A Ca-containing rust-resistant steel having controlled amounts of inclusions and S concentration, said Ca-containing steel comprising Ca at a concentration of 0.0005 wt% or more, characterized in that the composition of said inclusions and said S concentration in said steel are so controlled that the equilibrium S soluble amount (%S inc.) of CaO-containing oxide inclusions contained in said Ca-containing steel is about 0.03 wt% or less.

2. A Ca-containing rust-resistant steel according to claim 1, wherein the equilibrium S soluble amount (%S inc.) of at least 80% of said oxide inclusion particles, having a particle diameter of 2 μm or larger, is about 0.03 wt% or less.

3. A Ca-containing rust-resistant steel according to claim 1, wherein said equilibrium S soluble amount (%S inc.) value is determined in accordance with the following equation (1), including as its parameters the inclusions optical basicity calculated from the composition of said oxide inclusions, the casting temperature and the components forming the steel, such equation being

$$\log (\%S \text{ inc.}) = (21920 - 54640\Lambda)/T$$

+ 43.6Λ - 23.9 - long [aO] + log [wt%S],   ... (1)

wherein

T represents the casting temperature (K) during the continuous casting process,

[wt%S] represents the concentration of S contained in said steel,

[aO] represents the oxygen activity of said molten steel at said casting temperature (T) during a continuous casting process, and wherein during Al-deoxidation,

log aO = (-64000/T + 20.57 - 2log[wt%Al] - 0.086[wt%Al] - 0.102 [wt%Si]/3,

and wherein during Ti-deoxidation,

log aO = (-60709/T + 20.97 - 2log[wt%Ti] - 0.084[wt%Ti]/3,

and provided that, when Al and Ti are present in said steel a reduced aO oxygen activity is provided according to the following equation (2):

Λ = 1.0 X(CaO) + 0.605 X(Al$_2$O$_3$) + 0.601 X(TiO$_2$)

+ 0.78 X(MgO) + 0.48 X(SiO$_2$) + 0.55 X(Cr$_2$O3)

+ 0.59 X(MnO)   ... (2)

wherein

Λ represents the optical basicity of oxide inclusions, and

X (MmOn) represents the cation equivalent of the oxide present, according to the following equation (3):

$$X\ (MmOn) = n \times N(MmOn)/\Sigma\ (n \times N(MmOn)),\qquad \ldots\ (3)$$

wherein

N(MmOn) represents the mol fraction of oxide present and

n represents the valence of oxygen contained in said oxide.

4. A method for manufacturing a Ca-containing rust-resistant steel, said steel containing Ca at a concentration of about 5 ppm or more, comprising performing a refining process for refining said steel, wherein the composition of inclusions and the S concentration of steel are so controlled that the equilibrium S soluble amount (%S inc.) of CaO-containing oxide inclusions present in said Ca-containing steel is about 0.03 wt% or less.